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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Inventor(s):
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Title: Message Packet Logging in a Distributed Simulation System

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Examiner: Silver, David
Group/Art Unit: 2128
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Lawrence J. Merkel
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APPEAL BRIEF

Mail Stop Appeal Brief - Patents
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P.O. Box 1450
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Sir/Madam:

Further to the Notice of Appeal filed February 21, 2006 (with Pre-Appeal Brief Request for Review) and the Pre-Appeal Brief Decision mailed April 24, 2006, Appellants present this Appeal Brief. Appellants respectfully request that this appeal be considered by the Board of Patent Appeals and Interferences.

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I. REAL PARTY IN INTEREST

The present application is owned by Sun Microsystems, Inc. An assignment of the present application to Sun Microsystems, Inc. is recorded at Reel 012370, Frame 0883.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences known to Appellant.

III. STATUS OF CLAIMS

Claims 1-6, 10-11, 13-25, and 27-37 are pending. Claims 1-6, 10-11, 13-25, and 27-37 are rejected under 35 U.S.C. §§ 102(b) and 103(a) and the rejections of these claims are being appealed. A copy of claims 1-6, 10-11, 13-25, and 27-37 is included in the Claims Appendix attached hereto.

IV. STATUS OF AMENDMENTS

No unentered amendment to the claims has been filed after final rejection.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 1 is directed to a distributed simulation system (10). The distributed simulation system comprises two or more computer systems configured as a plurality of nodes (12A-12I) arranged to perform a simulation of a system under test. The plurality of nodes are configured to communicate simulation commands and signal values for the system under test using message packets transmitted between the plurality of nodes. At least one logging node (12E, 12C) of the plurality of nodes is configured to log the message packets in one or more log files (14) on at least one non-volatile storage medium during the simulation, wherein the at least one logging node is separate from nodes targeted by the message packets. See, e.g., specification Figs. 1 and 3; page 4, line

19-page 5, line 4; page 6, line 25-page 8, line 5; and page 13, lines 9-20.

Independent claim 13 is directed to an apparatus comprising a first node configured to simulate a portion of a system under test (e.g. node 12A); and at least one computer readable medium (300) storing instructions (302) which, when executed, read first message packets from a log file (14), wherein the first message packets were transmitted to a previous node simulating the portion in a preceding simulation, and wherein the instructions, when executed, transmit the first message packets to the first node during the simulation, and wherein the instructions, when executed, read second message packets from the log file, wherein the second message packets were sourced by the previous node simulating the portion in the preceding simulation, and wherein the instructions, when executed, verify that the first node sources corresponding message packets during the simulation. See, e.g., specification Figs. 1-3, and Figs. 5, 7, and 9; page 4, line 19-page 5, line 4; page 6, line 25-page 8, line 5; and page 8, line 13-page 9, line 29.

Independent claim 20 is directed to a method. A simulation of a system under test is performed in a plurality of nodes (12A-12I) of a distributed simulation system (10). The plurality of nodes are configured to communicate simulation commands and signal values for the system under test using message packets transmitted between the plurality of nodes. The message packets are logged in one or more log files (14) on at least one non-volatile storage medium during the simulation by at least one logging node (12E, 12C) of the plurality of nodes, wherein the at least one logging node is separate from nodes targeted by the message packets. See, e.g., specification Figs. 1 and 3; page 4, line 19-page 5, line 4; page 6, line 25-page 8, line 5; and page 13, lines 9-20.

Independent claim 31 is directed to one or more computer readable media (300) storing instructions (302) which, when executed on a logging node (12E, 12C) separate from simulation nodes in a distributed simulation system (10), log, in one or more log files (14) on at least one non-volatile storage medium, message packets transmitted during a simulation between a plurality of simulation nodes (12A-12I) forming the

distributed simulation system. The message packets communicate simulation commands and signal values for a system under test being simulated in the simulation. See, e.g., specification Figs. 1, 3, and 8; page 4, line 19-page 5, line 4; page 6, line 25-page 8, line 5; page 13, lines 9-20; and page 22, lines 13-27.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Claims 1, 20, and 31 are rejected under 35 U.S.C. § 102(b) as being anticipated by Damani et al., "Fault-Tolerant Distributed Simulation" ("Damani").

2. Claims 1, 6, 10-11, 20, 25, and 27-31 were rejected under 35 U.S.C. § 102(b) as being anticipated by Ulrich et al., U.S. Patent No. 5,466,200 ("Ulrich").

3. Claims 13-19 were rejected under 35 U.S.C. § 102(b) as being anticipated by Preiss, "The Yaddes Distributed Discrete Event Simulation Specification Language and Execution Environments" ("Preiss").

4. Claims 2-5, 21-24, and 32-35 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Damani in view of Stallmo et al., U.S. Patent No. 6,289,398 ("Stallmo").

5. Claims 1, 20, and 31 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Preiss.

6. Claims 29 and 36 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Damani in view of ANL "Modular Design Review" ("ANL").

7. Claims 30 and 37 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Damani in view of THFRC "Developing a Verifiable System" ("THFRC").

VII. ARGUMENT

First Ground of Rejection:

Claims 1, 20, and 31 are rejected under 35 U.S.C. § 102(b) as being anticipated by Damani. Appellants traverse this rejection for at least the following reasons.

Claims 1, 20, and 31:

Appellants respectfully submit that each of claims 1, 20, and 31 recites a combination of features not taught or suggested in Damani. For example claim 1 recites a combination of features including: "at least one logging node of the plurality of nodes is configured to log the message packets in one or more log files on at least one non-volatile storage medium during the simulation, wherein the at least one logging node is separate from nodes targeted by the message packets".

The Office Action mailed July 19, 2005 ("Office Action") asserts that Damani teaches message logging at section 2, paragraph 2, lines 1-5. These teachings are: "To avoid both synchronization and domino effect, some schemes also save the received messages on stable storage. This is called *message logging*. After a failure, a process restores its last checkpoint and replays the logged messages" (emphasis in original). While Damani does teach the general concept of message logging, Damani is silent on which node does the message logging. If anything, the last sentence quoted from Damani above implies that the process that is performing the simulation does the logging for that process. Thus, Damani does not teach or suggest "the at least one logging node is separate from nodes targeted by the message packets".

With respect to Damani, the Final Office Action mailed January 6, 2006 asserts that Damani teaches "the at least one logging node is separate from nodes targeted by the message packets" (as recited in claim 1) in the abstract, last four lines, stating that Damani allows for clustering of message logging nodes and therefore has at least two nodes that are separate from other nodes targeted by message packets (see Final Office Action, page 2, item 6). Damani teaches "A simple change is made in existing GVT algorithms to compute SGVT. Our use of transitive dependency tracking eliminates antimessages. LPs are clubbed in clusters to minimize stable storage access time" (Damani, abstract, last 5 lines). Thus, Damani does teach clustering of LPs (which are logical processes in the simulation -- see, e.g., Damani section 1, first two sentences). However, the clustering of LPs does not teach or suggest the above highlighted features of claim 1. Rather, the clustering of LPs merely teaches that multiple LPs are clustered

for access to stable storage, and each LP still logs the messages that are targeted at that LP. Thus, Damani does not teach or suggest the above highlighted features of claim 1.

For at least the above stated reasons, Appellants submit that the rejection of claim 1 is unsubstantiated in the art, and the rejection should be withdrawn.

Claim 20 recites a combination of features including: "logging the message packets in one or more log files on at least one non-volatile storage medium during the simulation by at least one logging node of the plurality of nodes, wherein the at least one logging node is separate from nodes targeted by the message packets". The same teachings of Damani highlighted above with regard to claim 1 are alleged to teach the features of claim 20. Appellants respectfully submit that Damani does not teach or suggest the above highlighted features, either. For at least the above stated reasons, Appellants submit that the rejection of claim 20 is unsubstantiated in the art, and the rejection should be withdrawn.

Claim 31 recites a combination of features including: "instructions which, when executed on a logging node separate from simulation nodes in a distributed simulation system, log, in one or more log files on at least one non-volatile storage medium, message packets transmitted during a simulation between a plurality of simulation nodes". The same teachings of Damani highlighted above with regard to claim 1 are alleged to teach the features of claim 31. Appellants respectfully submit that Damani does not teach or suggest the above highlighted features, either. For at least the above stated reasons, Appellants submit that the rejection of claim 31 is unsubstantiated in the art, and the rejection should be withdrawn.

For at least all of the above stated reasons, Appellants respectfully submit that the rejection of claims 1, 20, and 31 is in error and request reversal of the rejection.

Second Ground of Rejection:

Claims 1, 6, 10-11, 20, 25, and 27-31 were rejected under 35 U.S.C. § 102(b) as being anticipated by Ulrich. Appellants traverse this rejection for at least the following reasons.

Appellants note that, while claims 29 and 30 are listed in the second ground of rejection in the Final Office Action, no specific rejection of claims 29 and 30 is made in this ground. Appellants respectfully submit that the combinations of features recited in claims 29 and 30 are not taught or suggested by Ulrich.

Claims 1, 20, and 31:

Appellants respectfully submit that each of claims 1, 20, and 31 recites a combination of features not taught or suggested in Ulrich. For example claim 1 recites a combination of features including: "at least one logging node of the plurality of nodes is configured to log the message packets in one or more log files on at least one non-volatile storage medium during the simulation, wherein the at least one logging node is separate from nodes targeted by the message packets".

The Office Action asserts that Ulrich teaches the features of claim 1. Specifically, the Office Action asserted that Ulrich's storing of message packets in memory for access by the CPU comprises message logging. Appellants respectfully disagree. Rather, Ulrich's messages are only temporarily stored in memory until the CPU processes the message.

Furthermore, Appellants submit that Ulrich's storing of messages in memory does not each or suggest "log the message packets in one or more log files on at least one non-volatile storage medium" as recited in claim 1. Additionally, Ulrich's "nodes" are exercise machines, and the "simulation" of Ulrich is related to providing a simulated environment for the users of the exercise machines. This has nothing to do with simulating a system under test, as recited in claim 1.

The Response to Arguments section of the Final Office Action asserts that Ulrich teaches "at least one logging node of the plurality of nodes is configured to log the message packets in one or more log files on at least one non-volatile storage medium" at col. 4, lines 62-65 and col. 4, lines 28-29. However, col. 4, lines 59-65 of Ulrich teach "Regardless of the type of microprocessor employed, the computer typically also includes one or more electronic storage devices for storing one or more databases which describe the simulated environment(s). The storage devices can include CD-ROMs, hard disk drives, floppy disk drives, read only memories (ROMs), or random access memories (RAMs)." Thus, Ulrich's computers have storage devices that store databases describing the simulated environment. Such databases are not message packets [that communicate simulation commands and signal values], as recited in claim 1.

Additionally, the Response to Arguments section asserts that the simulation of a system under test is a statement of intended use. Appellants respectfully disagree. Rather, the simulation of a system under test defines the nodes. For example, claim 1 recites "the plurality of nodes are configured to communicate simulation commands and *signal values for the system under test* using message packets transmitted between the plurality of nodes". There is no disclosure in Ulrich that his system of networked exercise machines is capable of such operation. Rather, the information passed between Ulrich's networked exercise machines is summarized at col. 7, lines 34-42: "As mentioned previously with reference to FIG. 3, the computer (18 in FIG. 1, 32 in FIG. 2A) can be interconnected with computers of one or more other exercise apparatus via a network interface module. With two or more of these exercise apparatus networked together, the computers can communicate and share information and allow the users to navigate freely in the same simulated environment and to interact as teammates or competitors". The information may include user width, pedal speed, and steering tilt (Ulrich, col. 8, lines 19-20), voice (Ulrich, col. 8, lines 42-43), etc. This has nothing to do with simulation commands and signal values for the system under test.

Furthermore, the Final Office Action alleges that Ulrich teaches a system under test as the electronic system being simulated at col. 7, lines 24-35. However, these

teachings are: "The digital control system 82 is connected to the brake 79 by wires 80. Responsive to the interactive software in the computer 32, the control system 82 controls the pedal resistance of the braking device 79 electronically, thereby emulating the traditional flywheel/freewheel arrangement to provide the proper combination of pedal resistance and inertia for smooth pedaling revolutions. For example, an extremely light resistance is provided to simulate downhill travel and higher resistance is provided to simulate gear changes, wind resistance, and hills. The pedals can be driven backwards to reverse direction." Thus, the electronic system is not the system under test, but rather is the system that is performing the simulation (of a pedaled vehicle, such as a bicycle, which is *not an electronic system*).

For at least the above stated reasons, Appellants submit that the rejection of claim 1 is unsubstantiated in the art, and the rejection should be withdrawn.

Claim 20 recites a combination of features including: "logging the message packets in one or more log files on at least one non-volatile storage medium during the simulation by at least one logging node of the plurality of nodes, wherein the at least one logging node is separate from nodes targeted by the message packets". The same teachings of Ulrich highlighted above with regard to claim 1 are alleged to teach the features of claim 20. Appellants respectfully submit that Ulrich does not teach or suggest the above highlighted features, either. For at least the above stated reasons, Appellants submit that the rejection of claim 20 is unsubstantiated in the art, and the rejection should be withdrawn.

Claim 31 recites a combination of features including: "instructions which, when executed on a logging node separate from simulation nodes in a distributed simulation system, log, in one or more log files on at least one non-volatile storage medium, message packets transmitted during a simulation between a plurality of simulation nodes". The same teachings of Ulrich highlighted above with regard to claim 1 are alleged to teach the features of claim 31. Appellants respectfully submit that Ulrich does not teach or suggest the above highlighted features, either. For at least the above stated

reasons, Appellants submit that the rejection of claim 31 is unsubstantiated in the art, and the rejection should be withdrawn.

For at least all of the above stated reasons, Appellants respectfully submit that the rejection of claims 1, 20, and 31 is in error and request reversal of the rejection.

Claims 6 and 25:

Claims 6 and 25 depend from claims 1 and 20, respectively. Thus, the rejection of claims 6 and 25 is in error for at least the reasons given above with regard to claims 1 and 20. Additionally, Appellants respectfully submit that each of claims 6 and 25 recite additional combinations of features not taught or suggested in Ulrich. For example, claims 6 and 25 each recite combinations of features including "the logging node is a hub of the distributed simulation system".

The Final Office Action alleges that Ulrich teaches the above features at col. 3, lines 45-49 and col. 8, line 27. At col. 3, lines 45-49, Ulrich indeed teaches a hub. However, no teaching is provided that the hub is a logging node. Col. 8, line 27 discusses each node updating an environment database. This has nothing to do with the above highlighted features.

For at least the above stated reasons, Appellants submit that the rejection of claims 6 and 25 is in error and request reversal of the rejection.

Claims 10 and 27:

Claims 10 and 27 depend from claims 1 and 20, respectively. Thus, the rejection of claims 10 and 27 is in error for at least the reasons given above with regard to claims 1 and 20. Additionally, Appellants respectfully submit that each of claims 10 and 27 recite additional combinations of features not taught or suggested in Ulrich. For example, claims 10 and 27 each recite combinations of features including "the logging node is a distributed control node".

The Final Office Action alleges that Ulrich teaches the above features at col. 8, lines 27-28, col. 4, lines 62-65, and col. 4, lines 28-29. At col. 8, lines 27-28, Ulrich discusses each node updating an environment database. At col. 4, lines 62-65, Ulrich discusses various storage devices such as CD-ROMs, hard and floppy disk drives, memory, etc. At col. 4, lines 28-29, Ulrich states that his exercise devise has a seat. None of these teachings have anything even remotely to do with the features of claims 10 and 27.

For at least the above stated reasons, Appellants submit that the rejection of claims 10 and 27 is in error and request reversal of the rejection.

Claims 11 and 28:

Claims 11 and 28 depend from claims 10 and 27, respectively. Thus, the rejection of claims 11 and 28 is in error for at least the reasons given above with regard to claims 10 and 27. Additionally, Appellants respectfully submit that each of claims 11 and 28 recite additional combinations of features not taught or suggested in Ulrich. For example, claims 11 and 28 each recite combinations of features including "the hub is configured to route message packets to the distributed control node even if the message packets are not otherwise destined for the distributed control node".

The Final Office Action alleges that Ulrich teaches the above features at col. 3, lines 45-57 and col. 8, lines 27-28. At col. 3, lines 45-57, Ulrich generally teaches hubs. However, no teaching is provided that "the hub is configured to route message packets to the distributed control node even if the message packets are not otherwise destined for the distributed control node". Col. 8, lines 27-28 discusses each node updating an environment database. This has nothing to do with the above highlighted features.

For at least the above stated reasons, Appellants submit that the rejection of claims 11 and 28 is in error and request reversal of the rejection.

Third Ground of Rejection:

Claims 13-19 were rejected under 35 U.S.C. § 102(b) as being anticipated by Preiss. Appellants traverse this rejection for at least the following reasons.

Claim 13:

Appellants respectfully submit that claim 13 recites a combination of features not taught or suggested in Preiss. For example claim 13 recites a combination of features including: "read first message packets from a log file, wherein the first message packets were transmitted to a previous node simulating the portion in a preceding simulation". The Final Office Action alleges that Preiss teaches the above highlighted features at page 11, the model ReadFromFile. While this page does show code that purports to read events from an input file, there is no teaching that these events include "message packets were transmitted to a previous node simulating the portion in a preceding simulation". Accordingly, Preiss fails to anticipate claim 13 for at least this reason.

Furthermore, claim 13 recites a combination of features including: "read second message packets from the log file, wherein the second message packets were sourced by the previous node simulating the portion in the preceding simulation". The present Office Action alleges that Preiss teaches the above highlighted features at page 12, the model WriteToFile. This page shows code that purports to write events to a file, which has nothing to do with reading second message packets from a log file. Furthermore, nothing in Preiss teaches or suggests "read second message packets from the log file, wherein the second message packets were sourced by the previous node simulating the portion in the preceding simulation".

For at least the above stated reasons, Appellants submit that the rejection of claim 13 is in error and request reversal of the rejection.

Claim 14:

Claim 14 depends from claim 13. Thus, the rejection of claim 14 is in error for at least the reasons given above with regard to claim 13. Additionally, Appellants

respectfully submit that claim 14 recites additional combinations of features not taught or suggested in Preiss. For example, claim 14 recites a combination of features including "the log file contains only the first message packets and the second message packets".

The Final Office Action again cites Preiss' model ReadFromFile, and states that "the model only outputs and inputs the content it has written therefore it complies with the limitation" (See Final Office Action, page 7, last paragraph). However, the ReadFromFile model does not appear to write anything. Accordingly, the Final Office Action's assertion is in error. Furthermore, the model reading and writing file contents says nothing about whether or not the file has other content (e.g. it does not teach that there are no other writers to the file). Accordingly, even the Final Office Action's erroneous assertion does not teach or suggest the features of claim 14.

For at least the above stated reasons, Appellants submit that the rejection of claim 14 is in error and request reversal of the rejection.

Claim 15:

Claim 15 depends from claim 13. Thus, the rejection of claim 15 is in error for at least the reasons given above with regard to claim 13. Additionally, Appellants respectfully submit that claim 15 recites additional combinations of features not taught or suggested in Preiss. For example, claim 15 recites a combination of features including "the log file contains each message packet transmitted in the preceding simulation".

The Final Office Action again cites Preiss' model ReadFromFile, and states that "the model only outputs and inputs the content it has written therefore it complies with the limitation" (See Final Office Action, page 8, first paragraph). However, the ReadFromFile model does not appear to write anything. Accordingly, the Final Office Action's assertion is in error.

For at least the above stated reasons, Appellants submit that the rejection of claim 15 is in error and request reversal of the rejection.

Claim 16:

Claim 16 depends from claim 15. Thus, the rejection of claim 16 is in error for at least the reasons given above with regard to claim 15. Additionally, Appellants respectfully submit that claim 16 recites additional combinations of features not taught or suggested in Preiss. For example, claim 16 recites a combination of features including "the instructions, when executed, ignore message packets other than the first message packets and the second message packets in the log file".

The Final Office Action again cites Preiss' model ReadFromFile, and states that "because only the first and the second message packets exist in the log file the disclosed system fully complies with the limitation" (See Final Office Action, page 8, second paragraph). Appellants respectfully disagree. If only the first and second message packets (which the Final Office Action asserted, with regard to claim 13, were read and written by the model) are in the file, there are no message packets to ignore. Thus, even the Final Office Action's erroneous assertion fails to teach or suggest the features of claim 16.

For at least the above stated reasons, Appellants submit that the rejection of claim 16 is in error and request reversal of the rejection.

Claim 17:

Claim 17 depends from claim 13. Thus, the rejection of claim 17 is in error for at least the reasons given above with regard to claim 13. Additionally, Appellants respectfully submit that claim 17 recites additional combinations of features not taught or suggested in Preiss. For example, claim 17 recites a combination of features including "the simulation excludes other portions of the system under test".

The Final Office Action cites Preiss page 22, and states that "specifically, discard all older information than Tf" (See Final Office Action, page 8, third paragraph). Appellants respectfully disagree. The variable Tf is a measure of time, and the phrase

cited by the Final Office Action is referring to discarding all information older than a specific time. This has nothing to do with performing a simulation of a portion of a system under test that excludes other portions of the system under test.

For at least the above stated reasons, Appellants submit that the rejection of claim 17 is in error and request reversal of the rejection.

Claim 18:

Claim 18 depends from claim 13. Thus, the rejection of claim 18 is in error for at least the reasons given above with regard to claim 13. Additionally, Appellants respectfully submit that claim 18 recites additional combinations of features not taught or suggested in Preiss. For example, claim 18 recites a combination of features including "the instructions are executed in a second node coupled to the first node".

The Final Office Action cites Preiss page 22, and states that "specifically, send (I, tf, tmin to lp(j+1) mod n the 'send' command explicitly defines a coupling" (See Final Office Action, page 8, fourth paragraph). Appellants respectfully submit that, while the cited section of Preiss may refer to transmitting information to another node, it does not teach that the instructions (of claim 13) are executed in another node coupled to the node perform the simulation.

For at least the above stated reasons, Appellants submit that the rejection of claim 18 is in error and request reversal of the rejection.

Claim 19:

Claim 19 depends from claim 13. Thus, the rejection of claim 19 is in error for at least the reasons given above with regard to claim 13. Additionally, Appellants respectfully submit that claim 19 recites additional combinations of features not taught or suggested in Preiss. For example, claim 19 recites a combination of features including "the instructions are executed by the first node".

The Final Office Action asserts that the instructions (of claim 13) are inherently executed in Preiss' system by the node that is reading and writing the model (see Final Office Action, page 8, fifth paragraph). Appellants respectfully disagree. For a feature to be inherent, there must be no other way for the cited art to implement other features that are taught by the cited art. In this case, the Final Office Action has asserted (for claim 18) that the reference teaches executing the instructions in a second node different from the first node. Accordingly, even the Final Office Action's erroneous assertions with regard to claim 18 illustrate that the reference fails the inherency test.

For at least the above stated reasons, Appellants submit that the rejection of claim 19 is in error and request reversal of the rejection.

Fourth Ground of Rejection:

Claims 2-5, 21-24, and 32-35 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Damani in view of Stallmo. Appellants traverse this rejection for at least the following reasons.

Claims 2, 5, 21, 24, 32, and 35:

Claims 2, 21, and 32 depend from claims 1, 20, and 31, respectively. Thus, the rejection of claims 2, 21, and 32 is in error for at least the reasons given above with regard to claims 1, 20, and 31. Additionally, Appellants respectfully submit that each of claims 2, 21, and 32 recites additional combinations of features not taught or suggested in Damani in view of Stallmo. For example, claim 2 recites a combination of features including "if a first node of the plurality of nodes fails during the simulation, the distributed simulation system is configured to establish a second node, and wherein a third node of the plurality of nodes is configured to read message packets that were transmitted to the first node from the log file and to transmit the message packets to the second node".

The Final Office Action asserts that Stallmo teaches the features of claim 2, citing col. 15, lines 52-56. However, Stallmo's process of rebuilding data from a failed storage

device and writing it the warm spare does not teach or suggest "a third node of the plurality of nodes is configured to read message packets that were transmitted to the first node from the log file and to transmit the message packets to the second node". Rather, the data is generated, or read, from other storage devices (depending on the configuration) and written to the new storage device. This is not the same as reading message packets that were transmitted to the first (failed) node and transmitting those message packets to the second node.

Claim 21 recites a combination of features including: "a first node of the plurality of nodes failing during the simulation; establishing a second node responsive to the failing; and transmitting message packets to the second node that were transmitted to the first node, the message packets read from the log file". The same teachings of Stallmo highlighted above with regard to claim 2 are alleged to teach the features of claim 21. Appellants respectfully submit that Stallmo does not teach or suggest the above highlighted features, either. For at least the above stated reasons, Appellants submit that the rejection of claim 21 is unsubstantiated in the art, and the rejection should be withdrawn.

Claim 32 recites a combination of features including: "instructions which, when executed, establish a second node responsive to a first node of the plurality of nodes failing during the simulation, and wherein the instructions, when executed, transmit message packets to the second node that were transmitted to the first node, the message packets read from the log file". The same teachings of Stallmo highlighted above with regard to claim 2 are alleged to teach the features of claim 32. Appellants respectfully submit that Stallmo does not teach or suggest the above highlighted features, either. For at least the above stated reasons, Appellants submit that the rejection of claim 32 is unsubstantiated in the art, and the rejection should be withdrawn.

For at least the above stated reasons, Appellants submit that the rejection of claims 2, 21, and 32 is in error and request reversal of the rejection. Claim 5 depends from claim 2, and thus the rejection of claim 5 is not substantiated in the art and should

be withdrawn as well for at least the above stated reasons. Claim 5 recites additional combinations of features not taught or suggested in the cited art. Claim 24 depends from claim 21, and thus the rejection of claim 24 is not substantiated in the art and should be withdrawn as well for at least the above stated reasons. Claim 24 recites additional combinations of features not taught or suggested in the cited art. Claim 35 depends from claim 32, and thus the rejection of claim 35 is not substantiated in the art and should be withdrawn as well for at least the above stated reasons. Claim 35 recites additional combinations of features not taught or suggested in the cited art.

Claims 3, 22, and 33:

Claims 3, 22, and 33 depend from claims 2, 21, and 32, respectively. Thus, the rejection of claims 3, 22, and 33 is in error for at least the reasons given above with regard to claims 2, 21, and 32. Additionally, Appellants respectfully submit that each of claims 3, 22, and 33 recites additional combinations of features not taught or suggested in Damani in view of Stallmo. For example, claim 3 recites a combination of features including "resume the simulation subsequent to transmitting the message packets from the log file to the second node".

The Final Office Action asserts that Damani teaches the features of claim 3, citing section 1, column 2, lines 23-26. However, these teachings are: "Hence, restarting the failed process is a viable option, provided steps are taken to ensure that the resulting system state is consistent: for example, by rolling back the other processes". Thus, Damani has a general statement that the system state must be consistent, which does not teach or suggest the above highlighted features of claim 3, followed by an example that is the teaches away from claim 3: rolling back other processes to the state of the failed process.

Claim 22 recites a combination of features including: "resuming the simulation subsequent to transmitting the message packets from the log file to the second node". The same teachings of Damani highlighted above with regard to claim 3 are alleged to teach the features of claim 22. Appellants respectfully submit that Damani does not teach

or suggest the above highlighted features, either. For at least the above stated reasons, Appellants submit that the rejection of claim 22 is unsubstantiated in the art, and the rejection should be withdrawn.

Claim 33 recites a combination of features including: "resume the simulation subsequent to transmitting the message packets from the log file to the second node". The same teachings of Damani highlighted above with regard to claim 3 are alleged to teach the features of claim 33. Appellants respectfully submit that Damani does not teach or suggest the above highlighted features, either. For at least the above stated reasons, Appellants submit that the rejection of claim 33 is unsubstantiated in the art, and the rejection should be withdrawn.

For at least the above stated reasons, Appellants submit that the rejection of claims 3, 22, and 33 is in error and request reversal of the rejection.

Claims 4, 23, and 34:

Claims 4, 23, and 34 depend from claims 2, 21, and 32, respectively. Thus, the rejection of claims 4, 23, and 34 is in error for at least the reasons given above with regard to claims 2, 21, and 32. Additionally, Appellants respectfully submit that each of claims 4, 23, and 34 recites additional combinations of features not taught or suggested in Damani in view of Stallmo. For example, claim 4 recites a combination of features including "the third node is configured to verify that the second node transmits corresponding message packets".

The Final Office Action asserts that Stallmo teaches the features of claim 4, citing col. 15, line 65-col. 16 line 22. However, these teachings do not teach verifying that the second node transmits corresponding message packets. These teachings refer to rebuilding data that was stored on the failed storage node, using other data, and providing the rebuilt data in response to a read request. The data is not verified, it is known to be the proper data according to the design of the system.

Claim 23 recites a combination of features including: "verifying that the second node transmits corresponding message packets". The same teachings of Stallmo highlighted above with regard to claim 4 are alleged to teach the features of claim 23. Appellants respectfully submit that Stallmo does not teach or suggest the above highlighted features, either. For at least the above stated reasons, Appellants submit that the rejection of claim 23 is unsubstantiated in the art, and the rejection should be withdrawn.

Claim 34 recites a combination of features including: "verify that the second node transmits corresponding message packets". The same teachings of Stallmo highlighted above with regard to claim 4 are alleged to teach the features of claim 34. Appellants respectfully submit that Stallmo does not teach or suggest the above highlighted features, either. For at least the above stated reasons, Appellants submit that the rejection of claim 34 is unsubstantiated in the art, and the rejection should be withdrawn.

For at least the above stated reasons, Appellants submit that the rejection of claims 4, 23, and 34 is in error and request reversal of the rejection.

Fifth Ground of Rejection:

Claims 1, 20, and 31 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Preiss. Appellants traverse this rejection for at least the following reasons.

Claims 1, 20, and 31:

Appellants respectfully submit that each of claims 1, 20, and 31 recites a combination of features not taught or suggested in Preiss. For example claim 1 recites a combination of features including: "the at least one logging node is separate from nodes targeted by the message packets". The Final Office Action alleges that Preiss teaches the above highlighted features on page 20, citing the "to other processors" and "from other processors" portions of the figure. However, the "other processors" referred to in the figure appear to be the other processors that are executing other logical processes. .

Certainly, nothing in the figure on page 20 teaches or suggests that any of the processors is "at least one logging node . . . separate from nodes targeted by the message packets" as recited in claim 1.

The Final Office Action also takes Official Notice with respect to "log[ging] the message packets in one or more log files on at least one non-volatile storage medium during the simulation". Appellants have previously traversed the Official Notice, yet the Examiner has never supplied references supporting his assertion. Furthermore, Applicants respectfully submit that the Office Action has failed to form a *prima facie* case of obviousness. The Office Action asserts that it would be obvious to combine stable storage with Preiss "in order to achieve the many benefits of stable storage. Benefits include the ability to synchronize data flow and have stable storage means." Applicants respectfully submit that stable storage has nothing to do with synchronizing data flow, and the second "benefit" merely states stable storage again. This circular reasoning cannot be used to support a motivation to combine.

For at least the above stated reasons, Appellants submit that the rejection of claim 1 is unsubstantiated in the art, and the rejection should be withdrawn.

Claim 20 recites a combination of features including: "logging the message packets in one or more log files on at least one non-volatile storage medium during the simulation by at least one logging node of the plurality of nodes, wherein the at least one logging node is separate from nodes targeted by the message packets". The same teachings of Preiss highlighted above with regard to claim 1 are alleged to teach the features of claim 20. Appellants respectfully submit that Preiss does not teach or suggest the above highlighted features, either. For at least the above stated reasons, Appellants submit that the rejection of claim 20 is unsubstantiated in the art, and the rejection should be withdrawn.

Claim 31 recites a combination of features including: "instructions which, when executed on a logging node separate from simulation nodes in a distributed simulation

system, log, in one or more log files on at least one non-volatile storage medium, message packets transmitted during a simulation between a plurality of simulation nodes". The same teachings of Preiss highlighted above with regard to claim 1 are alleged to teach the features of claim 31. Appellants respectfully submit that Preiss does not teach or suggest the above highlighted features, either. For at least the above stated reasons, Appellants submit that the rejection of claim 31 is unsubstantiated in the art, and the rejection should be withdrawn.

For at least all of the above stated reasons, Appellants respectfully submit that the rejection of claims 1, 20, and 31 is in error and request reversal of the rejection.

Sixth Ground of Rejection:

Claims 29 and 36 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Damani in view of ANL. Appellants traverse this rejection for at least the following reasons.

Claims 29 and 36:

Claims 29 and 36 depend from claims 20 and 31, respectively. Thus, the rejection of claims 29 and 36 is in error for at least the reasons given above with regard to claims 20 and 31. Additionally, Appellants respectfully submit that each of claims 29 and 36 recites additional combinations of features not taught or suggested in Damani in view of ANL. For example, claim 29 recites a combination of features including "reading message packets from the log file which were transmitted to a node simulating a first portion of the system under test during the simulation for transmission to a first node simulating a portion of the system under test in a second simulation including the portion and excluding other portions of the system under test; and transmitting the message packets to the first node".

The Final Office Action asserts that ANL teaches the above features of claim 29. However, ANL is describing writing code in a modular fashion, such that the components can be plugged together and reused in other programs. This has nothing even remotely to

do with simulating a system under test, nor of reading message packets from a previous simulation and transmitting those packets in a current simulation, as highlighted above.

Claim 36 recites a combination of features including: "read message packets from the log file which were transmitted to a node simulating a first portion of the system under test during the simulation for transmission to a first node simulating a portion of the system under test in a second simulation including the portion and excluding other portions of the system under test; and transmit the message packets to the first node." The same teachings of ANL highlighted above with regard to claim 29 are alleged to teach the features of claim 36. Appellants respectfully submit that ANL does not teach or suggest the above highlighted features, either. For at least the above stated reasons, Appellants submit that the rejection of claim 36 is unsubstantiated in the art, and the rejection should be withdrawn.

For at least the above stated reasons, Appellants submit that the rejection of claims 29 and 36 is in error and request reversal of the rejection.

Seventh Ground of Rejection:

Claims 30 and 37 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Damani in view of THFRC. Appellants traverse this rejection for at least the following reasons.

Claims 30 and 37:

Claims 30 and 37 depend from claims 20 and 31, respectively. Thus, the rejection of claims 30 and 37 is in error for at least the reasons given above with regard to claims 20 and 31. Additionally, Appellants respectfully submit that each of claims 30 and 37 recites additional combinations of features not taught or suggested in Damani in view of THFRC. For example, claim 30 recites a combination of features including "reading message packets from the log file which were transmitted by a node simulating a first portion of the system under test during the simulation, the reading performed during a second simulation including a first portion of the system under test and excluding other

portions of the system under test; and verifying the message packets are transmitted by a first node simulating the first portion in the second simulation."

The Final Office Action asserts that THFRC teaches the above features of claim 30, citing a paragraph on page 6 of the document. However, this highlighted paragraph merely describes that two data sets are required, one to be used during system development and another to be used after the system is developed. The data sets include input values and the correct output values. However, the section does not teach that the data sets are created from a prior simulation. Rather, they are created from a specification for the system (e.g. by a test engineer).

Claim 37 recites a combination of features including: " read message packets from the log file which were transmitted by a node simulating a first portion of the system under test during the simulation, the reading performed during a second simulation including a first portion of the system under test and excluding other portions of the system under test; and verify the message packets are transmitted by a first node simulating the first portion in the second simulation." The same teachings of THFRC highlighted above with regard to claim 30 are alleged to teach the features of claim 37. Appellants respectfully submit that THFRC does not teach or suggest the above highlighted features, either. For at least the above stated reasons, Appellants submit that the rejection of claim 37 is unsubstantiated in the art, and the rejection should be withdrawn.

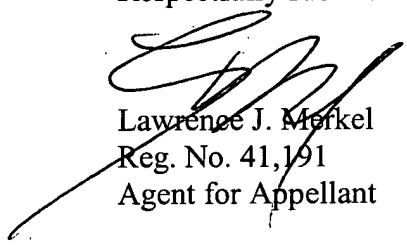
For at least the above stated reasons, Appellants submit that the rejection of claims 30 and 37 is in error and request reversal of the rejection.

VIII. CONCLUSION

For the foregoing reasons, it is submitted that the Examiner's rejection of claims 1-6, 10-11, 13-25, and 27-37 was erroneous, and reversal of the decision is respectfully requested.

The Commissioner is authorized to charge the appeal brief fee of $500.00 and any other fees that may be due to Meyertons, Hood, Kivlin, Kowert, & Goetzel, P.C. Deposit Account No. 501505/5681-03600/LJM. This Appeal Brief is submitted with a return receipt postcard.

Respectfully submitted,



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Date: May 5, 2006

IX. CLAIMS APPENDIX

The claims on appeal are as follows.

1. A distributed simulation system comprising:

two or more computer systems configured as a plurality of nodes arranged to perform a simulation of a system under test, wherein the plurality of nodes are configured to communicate simulation commands and signal values for the system under test using message packets transmitted between the plurality of nodes, and

at least one logging node of the plurality of nodes is configured to log the message packets in one or more log files on at least one non-volatile storage medium during the simulation, wherein the at least one logging node is separate from nodes targeted by the message packets.

2. The distributed simulation system as recited in claim 1 wherein, if a first node of the plurality of nodes fails during the simulation, the distributed simulation system is configured to establish a second node, and wherein a third node of the plurality of nodes is configured to read message packets that were transmitted to the first node from the log file and to transmit the message packets to the second node.

3. The distributed simulation system as recited in claim 2 wherein the distributed simulation system is configured to pause the simulation prior to transmitting the message packets to the second node, and wherein one of the plurality of nodes is configured to resume the simulation subsequent to transmitting the message packets from the log file to the second node.

4. The distributed simulation system as recited in claim 2 wherein the third node is further configured to detect message packets in the log file which were sourced by the

first node, and wherein the third node is configured to verify that the second node transmits corresponding message packets.

5. The distributed simulation system as recited in claim 2 wherein the second node is configured to load a simulator state corresponding to a simulation checkpoint, and wherein the third node is configured to transmit, to the second node, message packets that were transmitted to the first node if the message packets occurred after the simulation checkpoint, and wherein the third node is configured not to transmit, to the second node, message packets that were transmitted to the first node if the message packets occurred prior to the simulation check point.

6. The distributed simulation system as recited in claim 1 wherein the logging node is a hub of the distributed simulation system.

10. The distributed simulation system as recited in claim 1 wherein the logging node is a distributed control node.

11. The distributed simulation system as recited in claim 10 wherein one of the plurality of nodes is a hub, and wherein the hub is configured to route message packets to the distributed control node even if the message packets are not otherwise destined for the distributed control node.

13. An apparatus comprising:

a first node configured to simulate a portion of a system under test; and

at least one computer readable medium storing instructions which, when executed, read first message packets from a log file, wherein the first message packets were transmitted to a previous node simulating the portion in a preceding simulation, and wherein the instructions, when executed, transmit the first message packets to the first node during the

simulation, and wherein the instructions, when executed, read second message packets from the log file, wherein the second message packets were sourced by the previous node simulating the portion in the preceding simulation, and wherein the instructions, when executed, verify that the first node sources corresponding message packets during the simulation.

14. The apparatus as recited in claim 13 wherein the log file contains only the first message packets and the second message packets.

15. The apparatus as recited in claim 13 wherein the log file contains each message packet transmitted in the preceding simulation.

16. The apparatus as recited in claim 15 wherein the instructions, when executed, ignore message packets other than the first message packets and the second message packets in the log file.

17. The apparatus as recited in claim 13 wherein the simulation excludes other portions of the system under test.

18. The apparatus as recited in claim 13 wherein the instructions are executed in a second node coupled to the first node.

19. The apparatus as recited in claim 13 wherein the instructions are executed by the first node.

20. A method comprising:

performing a simulation of a system under test in a plurality of nodes of a distributed simulation system, the plurality of nodes configured to communicate simulation commands and signal values for the system under test using message packets transmitted between the plurality of

nodes; and

logging the message packets in one or more log files on at least one non-volatile storage medium during the simulation by at least one logging node of the plurality of nodes, wherein the at least one logging node is separate from nodes targeted by the message packets.

21. The method as recited in claim 20 further comprising:

a first node of the plurality of nodes failing during the simulation;

establishing a second node responsive to the failing; and

transmitting message packets to the second node that were transmitted to the first node, the message packets read from the log file.

22. The method as recited in claim 21 further comprising:

pausing the simulation prior to transmitting the message packets to the second node; and

resuming the simulation subsequent to transmitting the message packets from the log file to the second node.

23. The method as recited in claim 21 further comprising:

detecting message packets in the log file which were sourced by the first node; and

verifying that the second node transmits corresponding message packets.

24. The method as recited in claim 21 further comprising the second node loading a simulator state corresponding to a simulation checkpoint, and wherein transmitting message packets to the second node comprises transmitting, to the second node, message packets that were transmitted to the first node if the message packets occurred after the simulation checkpoint, and not transmitting, to the second node, message packets that were transmitted to the first node if the message packets occurred prior to the simulation check point.

25. The method as recited in claim 20 wherein the logging node is a hub of the distributed simulation system.

27. The method as recited in claim 20 wherein the logging node is a distributed control node.

28. The method as recited in claim 27 wherein one of the plurality of nodes is a hub, the method further comprising the hub routing message packets to the distributed control node even if the message packets are not otherwise destined for the distributed control node.

29. The method as recited in claim 20 further comprising:

reading message packets from the log file which were transmitted to a node simulating a first portion of the system under test during the simulation for transmission to a first node simulating a portion of the system under test in a second simulation including the portion and excluding other portions of the system under test; and

transmitting the message packets to the first node.

30. The method as recited in claim 20 further comprising:

reading message packets from the log file which were transmitted by a node simulating a first portion of the system under test during the simulation, the reading performed during a second simulation including a first portion of the system under test and excluding other portions of the system under test; and

verifying the message packets are transmitted by a first node simulating the first portion in the second simulation.

31. One or more computer readable media storing instructions which, when executed on a logging node separate from simulation nodes in a distributed simulation system, log, in one or more log files on at least one non-volatile storage medium, message packets transmitted during a simulation between a plurality of simulation nodes forming the distributed simulation system, the message packets communicating simulation commands and signal values for a system under test being simulated in the simulation.

32. The computer readable media as recited in claim 31 further comprising instructions which, when executed, establish a second node responsive to a first node of the plurality of nodes failing during the simulation, and wherein the instructions, when executed, transmit message packets to the second node that were transmitted to the first node, the message packets read from the log file.

33. The computer readable media as recited in claim 32 further comprising instructions which, when executed, pause the simulation prior to transmitting the message packets to the second node, and resume the simulation subsequent to transmitting the message packets from the log file to the second node.

34. The computer readable media as recited in claim 32 further comprising instructions which, when executed, detect message packets in the log file which were sourced by the first node, and verify that the second node transmits corresponding message packets.

35. The computer readable media as recited in claim 32 further comprising instructions which, when executed, load a simulator state corresponding to a simulation checkpoint into the second node, and wherein transmitting message packets to the second node comprises transmitting, to the second node, message packets that were transmitted to the first node if the message packets occurred after the simulation checkpoint, and not transmitting, to the second node, message packets that were transmitted to the first node if the message packets occurred prior to the simulation check point.

36. The computer readable media as recited in claim 31 further comprising instructions which, when executed:

read message packets from the log file which were transmitted to a node simulating a first portion of the system under test during the simulation for transmission to a first node simulating a portion of the system under test in a second simulation including the portion and excluding other portions of the system under test; and

transmit the message packets to the first node.

37. The computer readable media as recited in claim 31 further comprising instructions which, when executed:

read message packets from the log file which were transmitted by a node simulating a first portion of the system under test during the simulation, the reading performed during a second simulation including a first portion of the system under test and excluding other portions of the system under test; and

verify the message packets are transmitted by a first node simulating the first portion in the second simulation.

X. EVIDENCE APPENDIX

No evidence submitted under 37 CFR §§ 1.130, 1.131 or 1.132 or otherwise entered by the Examiner is relied upon in this appeal.

XI. RELATED PROCEEDINGS APPENDIX

There are no related proceedings known to Appellant.